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SECRETARY OF THE AIR FORCE

AIR FORCE HANDBOOK 41-318

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Health Services

AMBULANCE BUS (AMBUS) TRAINING STANDARDS

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OPR: HQ AMC/SGXT
(MSgt Charles E. Jones)

Certified by: HQ USAF/SGX
(Brig Gen Linda Stierle)
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This is the initial publication of Air Force Handbook (AFH) 41-318. This handbook provides a standardized training program for individuals who need to be familiar with the operation of the Ambulance Bus (AMBUS) to accomplish their daily mission. Use as a reference guide in conjunction with Air Force Instruction (AFI) 41-305, *Administering Aeromedical Staging Facilities,* and AFH 41-312, *Aeromedical Evacuation Contingency Operations Training (AECOT);* Volumes 1 and 4. Send comments and suggested improvements on AF Form 847, **Recommendation for Change of Publication**, through channels, to HQ AMC/SGXT, 203 West Losey Street, Room 1180, Scott AFB IL 62225-5219.

Chapter 1

GENERAL INFORMATION AND TRAINING PROGRAM OUTLINE

1.1. Description. The Ambulance Bus (AMBUS) is a specialty vehicle designed to transport 44 ambulatory or 12 litter patients. Depending on mission requirements, various combinations of litter and ambulatory configurations is possible. Operation is unique due to its size and weight. Powered by a diesel engine with an automatic transmission, it weighs approximately 31,000 pounds. Handling differs from conventional vehicles because the driver is forward of the front wheels. There are several makes and models currently in the Air Force inventory. This training handout discusses the most common year models used (refer to attachments 2 through 7).

1.2. Initial Training and Certification.

1.2.1. This program teaches operator's responsibility, maintenance, and safe AMBUS operations. Training is divided into two sections: didactic and practical. Refer to the lesson plan in **Attachment 9**.

1.2.2. Didactic training involves self-study and classroom instruction. The student operator becomes familiar with routine maintenance, vehicle instruments, starting procedures, environmental systems, off-base driving, and accident procedures. The unit Vehicle Control Officer (VCO) or Vehicle Control Non-Commissioned Officer (VCNCO) administers a unit designed open book exam at the conclusion of the didactic training.

1.2.3. Accomplish practical training through hands-on instruction. This includes daily operator inspection, driver preparation, starting and driving procedures, environmental systems, and casualty exercise responsibilities. Upon successful completion of the practical training, a unit designed closed book exam is administered. After passing the closed book exam, the instructor recommends the student for a final driving test. The primary or alternate VCO/VCNCO (or designee) will administer the final driving test and endorses the AF Form 171, **Request for Driver's Training and Addition to U.S. Government Driver's License**, for licensure (***NOTE*:** The primary instructor cannot administer the final driving test). At this point the student operator becomes a qualified operator and can have the AMBUS added to their AF Form 2293, **U.S. Air Force Motor Vehicle Operator Identification Card**.

1.3. Refresher Training for Air Reserve Component (ARC) Forces.

1.3.1. Qualified AMBUS operators holding a current AF Form 2293 must accomplish the following training every twelve months:

1.3.1.1. Self study with closed book test.

1.3.1.2. AMBUS orientation performed by unit VCO/VCNCO or designated vehicle trainer.

1.3.1.3. Practical experience driving an AMBUS or similar 44 passenger bus at least once a year.

1.3.1.4. Documentation in training record by unit VCO/VCNCO.

1.3.2. Personnel with AF Form 171 annotated with "For Contingency Use Only," will accomplish refresher training as determined by the unit commander.

Chapter 2

DRIVER'S INSPECTION

2.1. Exterior Inspection. The successful outcome of completing an AMBUS mission relies on pre-mission preparation. The operator is responsible for inspecting the bus at least once a day to ensure mission capability. Accomplish the following items prior to starting the engine:

2.1.1. Check the AF Form 1800, **Operator's Inspection Guide and Trouble Report (General Purpose Vehicles),** or AF Form 1800 Waiver Card, for waived or annotated discrepancies not reported to the vehicle maintenance flight.

2.1.2. Chock the right front wheel and accomplish a 360 degree exterior inspection starting with the front of the bus and proceeding counter-clockwise. The operator checks items on the AF Form 1800, identifies discrepancies not previously annotated (dents, scratches, tire conditions [i.e. flat, cuts, side wall damage, tread separation], missing valve caps, broken light lenses, etc.) and turns the bus into the vehicle maintenance flight for repair.

2.1.3. Look for obvious signs of fluid leaks.

2.1.4. Check and secure front access panels. On some models these coincide with the headlights. One panel accesses fuses while the other accesses the windshield washer fluid container and ether start bottle. If a panel is unsecured, the headlight beam can become compromised during braking.

2.1.5. Ensure cleanliness of windshield, side windows, and mirrors. Check the wiper blades for dry rot and wear. During winter conditions, clear all ice and snow.

2.1.6. Check headlights and side markers for cleanliness and signs of damage.

2.1.7. On left side of bus, open access panel to battery compartment. Ensure slide tray retainer bolt is in place and secure. Check batteries for corrosion on terminals and signs of leakage. If corrosion exists, remove terminal clamps. Clean both the terminal and clamp with a battery terminal brush. After check is complete, close and secure the battery compartment access panel.

2.1.8. Open spare tire compartment and visually check the spare tire. Alternate location for the spare tire is under the rear of the bus. Check all tire pressures at least once a month and annotate on the AF Form 1800. Close and secure access panel.

2.1.9. Don eye protection and purge the air pressure tank. Locate the tank under the driver's side posterior to the spare tire holder or left side compartment. Opening the valves on the underside of the tank allows fluid and debris to exit. This prevents malfunction of the air system components (brakes, windshield wipers, and front door) due to foreign substance in air lines. During cold weather, it prevents moisture build up and freezing in the brake lines. Close valves after purging.

2.1.10. At the left rear of the bus, open the air conditioner access panel. Check oil level. Check condition and tightness of belts. There should be approximately 1/4 to 1/2 inch play in the belt. Check switch to ensure it is in the desired position (refer to paragraph 3.3.1.5). Close and secure access panel.

2.1.11. Check rear side markers, tail lights, top flashing lights and cargo light for cleanliness and damage.

2.1.12. If a utility ramp is under the rear doors, ensure it is stowed and secured.

2.1.13. The right side storage compartment stores extra litter stanchions, straps, and miscellaneous equipment. If the bus doesn't have a rear slide-out ramp, a fold out ramp may be located in this compartment. Close and secure the compartment door.

2.2. Engine Inspection.

2.2.1. Open access ports in engine cover.

2.2.2. Check oil for appropriate level.

2.2.3. Check transmission fluid level. Unlike other vehicles, due to cold range markings on dipstick, check levels when cold (vehicle specific).

2.2.4. Check level of power steering fluid.

2.2.5. Check radiator fluid. Radiator access is generally in the forward part of the engine compartment. Remove radiator cap if engine is cool. (**WARNING:** Steam can cause burns when removing the radiator cap on a warm engine.) After removing cap on cool engine, check fluid level with middle finger. Level is okay if liquid is felt. If no liquid is felt, add additional fluid. (***NOTE*:** Never use a pen, pencil, or other item that can accidentally drop inside the radiator.)

2.2.6. Check fan belts for tightness and signs of wear. If belts have more than 1/2 inch of play or show signs of cracking, turn the vehicle into the vehicle maintenance flight for replacement.

2.2.7. Look for fluid leaks in engine compartment.

2.2.8. Check fluid level of alcohol evaporator (vehicle specific). Alcohol evaporator displaces moisture in the air system. Locate the evaporator behind left headlight access panel or in the engine compartment.

2.2.9. Before starting engine, turn valve in engine compartment to allow hot water to circulate to rear heaters (vehicle specific). Otherwise, heater fans will blow cold air. Adjust heater control panel to 70 degrees Fahrenheit.

2.3. Interior Inspection.

2.3.1. Inspect bus interior for trash on floor and dashboard. Trash on floor becomes a safety hazard during loading and/or unloading of patients and vehicle operation.

2.3.2. Check and secure litter stanchions. (**WARNING:** Swinging litter stanchions can break windows, injure patients and personnel.)

2.3.3. Ensure the following items are on the AMBUS:

- Reflective vest/belt (one [1] per staff member).
- Hearing protectors (one [1] per staff member).
- Fire extinguisher (check charge).
- Trauma Kit (contents per local policy).
- Two flashlights with high visibility cones and operational batteries.
- One set of emergency road-side reflectors.
- One set of wheel chocks.
- Tire tool and jack.

- Forms:
- AF Form 1800.
- AF Form 1800 **Waiver Card**.
- DD Form 518, **Accident Identification Card**.
- SF Form 91, **Operator's Report of Motor Vehicle Accident**.
- Base grid map.
- Local area map.

2.3.4. The oxygen delivery is from an "H" size cylinder located in the front or rear of the bus. Check the oxygen level prior to each mission. Minimum is 1,000 pounds per square inch (psi).

2.3.5. Properly secure oxygen tank.

2.3.6. Stock sufficient number of oxygen lines to meet mission requirements.

2.4. Starting Procedure.

2.4.1. Adjust driver's seat to a comfortable location.

2.4.2. Adjust mirrors for a proper view.

2.4.3. Turn master electric switch to the on position (if so equipped).

2.4.4. Put gear selector in neutral, turn key to "ON" position and wait for glow plug light to go off (if so equipped). (**WARNING:** Do not depress accelerator as engine flooding may occur.)

2.4.5. Turn key to start engine. (**WARNING:** Do not engage starter switch for longer than 10 seconds or an overheat condition and starter damage may occur.)

2.4.6. If the engine fails to start after two attempts, push the ether button and re-engage starter. If it still doesn't start, wait five (5) minutes before attempting another start. If engine becomes flooded, wait 30 minutes before another attempt.

2.4.7. If all attempts fail, notify vehicle maintenance flight for assistance.

2.5. Post Starting Check.

2.5.1. Once started, set throttle lock to 1,500-1,800 revolutions per minute (RPMs). The higher rpm generates more electrical power for accessory items. (**WARNING:** The batteries will discharge, over a 20-30 minute period, when idled at lower rpm settings.)

2.5.2. Monitor gauges and alarms to identify possible malfunctions.

2.5.2.1. An audible alarm sounds until air pressure reaches minimum operating psi.

2.5.2.2. Another audible alarm activates if the rear door is open.

2.5.3. Check fuel gauges (both air conditioner and engine fuel). If the tank is 1/2 full or less, proceed to the motor pool to refuel.

2.5.4. Check air breather gauge. If gauge is above zero, a partial blockage has occurred. Proceed to the motor pool for air breather replacement.

2.5.5. Turn on all lights (interior and exterior) and check operation. Ensure the turn signals, running, load, back-up and brake lights are functional.

2.5.6. Check the operation of the light bar and siren (if so equipped).

2.5.7. Once the air pressure is sufficient, check windshield wipers and front passenger door.

2.5.8. Allow the heater and air conditioner to run for 30 minutes prior to patient loading for sufficient heating or cooling of the interior. The thermostats for these units are in various locations around the vehicle. Your instructor will point out the exact location during practical training.

2.5.9. After the loading patients, ensure all passengers are properly seated or secure. Perform a final 360 degree check of the surrounding area. This orients the driver of possible obstacles and pedestrians. Unchock wheels before putting bus in motion.

Chapter 3

VEHICLE SYSTEMS

3.1. Dashboard. (See attachments 2 through 6 for appropriate year model).

3.1.1. Radio. Two-way radio is commonly found on top of the dashboard but may be in different locations. (***NOTE:*** The radio is usually connected directly to a power source and drains the battery if not turned off.)

3.1.2. Windshield Wiper Switch. The windshield wipers are driven by air pressure. You may hear a hissing sound during operation.

3.1.3. Air Cleaner Gauge. Indicates the status of the engine air cleaner.

3.1.4. Air Conditioner Fuel Gauge. The air conditioner fuel tank is located on the driver's side of the bus and is marked with type of fuel used. (***NOTE:*** Fuel used in the air conditioners depends on make and year model. Do not mix gasoline and diesel fuel.)

3.1.5. Ether Start Button. This is used only for cold starts.

3.1.6. Headlight/Parking Light Switch. Used to turn the headlights/parking lights on.

3.1.7. Ignition. Equipped with typical key switch ignition.

3.1.8. Water Temperature Gauge. Ranges from zero (0) to 220 degrees. (**WARNING:** Do not operate bus if gauge has full scale deflection on the hot side.)

3.1.9. Oil Gauge. Measures oil pressure in engine. (**WARNING:** If no pressure indication in 10 seconds, turn engine off immediately. If allowed to continue running, lack of lubrication will cause internal damage.)

3.1.10. Volt Gauge. Measures the output of the electrical charging system.

3.1.11. Warning Panel. If warning light should appear after the vehicle has been started, immediately check the system indicated in the light.

3.1.12. Tachometer. Shows how many RPMs the engine is operating.

3.1.13. Speedometer. Shows actual speed of the vehicle.

3.1.14. Vehicle Fuel Gauge. Shows amount of fuel in the fuel tank. (**WARNING:** Most vehicles run on diesel fuel. Do not put gasoline in a diesel tank. If gasoline is accidentally added to the diesel tank do not start engine. Notify vehicle maintenance flight personnel immediately!)

3.1.15. Air Pressure Gauges. Ranges from zero (0) to 150 psi. (***NOTE*:** A warning buzzer sounds indicating air pressure is building. The brakes will not release until sufficient air pressure is obtained.)

3.1.16. Auto Throttle. Allows driver to set a desired idle speed when parked. This is primarily used for warming up the bus during inclement weather and increased RPMs needed for prolonged idling operation. (***NOTE*:** Do not use the auto throttle as a cruise control.)

3.1.17. Fresh Air Vent. This vent provides outside air to the interior of the bus.

3.1.18. Parking Brake Release. This releases the parking brake. Bus transmissions have no park position and parking brake must be utilized to secure the vehicle for parking. (***NOTE*:** The parking brake will not release until sufficient air pressure has been reached.)

3.1.19. Gear Selector Lever. Indicates gear transmission is engaged.

3.1.20. Engine Cut-off Knob. This knob is usually located to the drivers right on, or near, the engine cover. Pull knob towards driver until engine quits.

3.2. Fuel System.

3.2.1. Most vehicles run on diesel fuel. Do not put gasoline in a diesel tank. If gasoline is accidentally added -- do not start engine. Notify vehicle maintenance flight personnel immediately!

3.2.2. The air conditioner is driven by it's own generator fueled with either gasoline or diesel. (**CAUTION:** Before refueling the air conditioner, determine the proper fuel (gasoline or diesel). Notify the vehicle maintenance flight if the wrong fuel is added to the fuel tank. Do not start engine!

3.3. Air Conditioner Operation.

3.3.1. Start-up Procedures.

3.3.1.1. The air conditioner control panel is located above the driver's head on the left side of the vehicle.

3.3.1.2. Move the load switch to the "UNLOAD" position, and the air conditioner ignition switch to the "ON" position. The start button can now be pushed.

3.3.1.3. If the air conditioner engine doesn't start after ten seconds, release the button and wait one (1) to two (2) minutes before trying again. If the air conditioner engine still doesn't start, simultaneously press the start and choke buttons but, for no longer than 10 seconds. Repeat as necessary to start the engine.

3.3.1.4. If after several attempts the engine still fails to respond to the start button, it may not be receiving sufficient power from the batteries.

3.3.1.5. Check the auxiliary control panel on the air conditioning unit (located on the left outside rear of bus). This panel allows operation of the air conditioning unit from outside the bus. Ensure operations switch is in desired position. There are three switch positions:

- Up, to operate from outside the bus.
- Middle, turns unit off.
- Down, to operate from inside the bus.

3.3.1.6. All switches must be in the down position or the air conditioner will not respond to inside controls.

3.3.1.7. Once the air conditioner engine has started, allow a five (5) minute warm up period. Move switch to the "LOAD" position and adjust temperature. If the warm up period is omitted, poor performance, stalling, broken belts and engine damage may occur.

3.3.1.8. If all switches are in the correct position, and the air conditioner still does not work, annotate on the AF Form 1800 and report the problem to the vehicle maintenance flight.

3.3.1.9. Check the air conditioner service log. Preventive maintenance should occur at 100 hour intervals (oil and filter change, new air filter, etc.).

3.3.2. Shutdown Procedure.

3.3.2.1. Move switch to "UNLOAD" and allow a five (5) minute cool down period. Without this cool down period poor performance, engine run-on, broken belts, and back firing can occur.

3.3.2.2. Move ignition switch to the "OFF" position.

3.3.3. Special Modifications. Some vehicles have after market air conditioner conversions. The most commonly seen are electrically powered roof top recreational vehicle (RV) style units.

3.4. Air System - General. The AMBUS utilizes an air pressure system comprised of two (2) independent sub-systems. If a malfunction of one sub-system occurs, the second sub-system performs as a backup. The air pressure system is responsible for brakes, windshield wipers, and front door operation. If both sub-systems fail, or there is inadequate air pressure, none of the above systems will operate.

3.5. Air Brakes.

3.5.1. Once the AMBUS engine starts, a compressor builds the air pressure to specified limits.

3.5.2. The minimum air pressure needed for safe operation of the brakes is 60 to 70 psi depending on the vehicle year model. When pressure is below these limits, an audible alarm sounds, accompanied by a red warning light on the driver's instrument panel. One or both of the air pressure gauges will indicate low air pressure.

3.5.3. After several minutes, if alarm continues and the pressure remains unchanged, turn the engine off.

3.5.4. Perform the following troubleshooting procedures:

- Ensure the air tank drain valves are closed. Locate the tank under the driver's side posterior to the spare tire holder or left side compartment (see **Attachment 7**).
- If drain valves are closed, there is a problem with the system. Notify the vehicle maintenance flight. **WARNING:** Do not attempt to drive vehicle.
- If valves are open, close and restart engine. Once correct air pressure is attained, the vehicle is ready to move.

3.5.5. Air brakes are very sensitive. The brakes lock when too much pressure is applied. Release brake and slowly reapply pressure until desired braking occurs. Smooth braking is learned through practical experience. It requires more time and distance than smaller vehicles to bring the AMBUS to a complete stop.

3.5.6. If the system malfunctions while in motion, the appropriate gauge(s) indicates low air pressure accompanied by an audible alarm and warning light. Failure of one subsystem greatly increases required braking distance. **WARNING:** If both systems lose pressure, the brakes automatically lock.

3.6. Parking Brake.

3.6.1. The parking brake is on the lower right portion of the driver's instrument panel.

3.6.2. Completely stop the AMBUS and place in neutral before applying the parking brake. **WARNING:** Never use this brake while in motion.

3.7. Windshield Wipers. Independent controls for left and right wipers are on the instrument panel (Refer to attachment 2 through 6). If wipers fail to operate, assure sufficient air pressure is in system. If sufficient pressure, try pushing wipers manually to get them started.

3.8. Front Door. Controls are on the instrument panel. Some models have manual controls independent of the air system. Before closing door, visually check for people or foreign objects in doorway.

3.9. Bus Configuration.

3.9.1. Litter stanchions are in storage boxes located on the floor or in the outside compartment. Remove and examine stanchions to assure they are serviceable.

3.9.2. To install, support the top of the seat, rotate knob on side, and lower the seat back.

3.9.3. Take wall bracket out of the storage box and attach to the side walls of the bus (***NOTE*:** There are two (2) brackets per litter station). Hang stanchion from eye bolts in ceiling.

Chapter 4

VEHICLE OPERATION

4.1. Forward Motion.

4.1.1. Press brake pedal, select proper gear, release parking brake, and brake pedal. **WARNING:** Do not attempt to drive the bus with parking brake engaged.

4.1.2. Never allow passengers to stand or sit forward of the white line at the front of the bus.

4.1.3. Never allow passengers to stand or leave the vehicle until completely stopped.

4.2. Steering. Safe and smooth maneuvering depends on how well you control the wheel. Resting your hand on the bottom portion of the wheel may be the most relaxed position but is certainly not the safest. The best method is placing both hands on the wheel at the 9 and 3 o'clock position.

4.2.1. Left Turn Steering. Approach left turns in the lane nearest the center of the roadway. Begin turn when the left wheel passes the center of the street you are turning on. Always monitor the left side view mirror to ensure obstacle clearance. ***NOTE*:** The speed of a bus directly effects its turning radius--the slower the speed, the sharper the turn.

4.2.2. Right Turn Steering. Approach right turns in the lane closest to the curb, with 4 1/2 feet of clearance and parallel to the curb. Begin turning steering wheel after the right front wheel passes the curb line of the street you are turning. Closely monitor the clearance of the left front bumper and the right rear wheel for clearance of obstacles.

4.3. Following Distances. Use the five second rule when following other vehicles. To use this method, watch a point or fixed object (such as a street sign) the vehicle in front of you is passing. Measure how long it takes to reach that point or object by counting "One thousand one, One thousand two, One thousand three. . .etc." If you pass the point before you reach "One thousand five," you are too close and need to increase the following distance.

4.4. Braking.

4.4.1. Since an AMBUS is a heavy vehicle, it requires a greater distance to stop. For this reason, you must always focus ahead of the vehicle and recognize possible situations requiring braking. Keep a safe following distance between you and the vehicle in front of you. To give your passengers a smooth ride, avoid "panic" braking. Bring the bus to a stop using a smooth application of brakes. Do not pump the brakes. Pumping decreases air pressure and causes brake linings to wear more quickly.

4.4.2. Stopping distance is greatly affected by perception and reaction time of the driver. Perception time is the interval during which the driver realizes a hazard exists. Reaction time is the actual time to initiate action to avoid the hazard. After applying brakes, stopping is strictly a mechanical operation determined by the speed of the vehicle, road conditions and rate of deceleration. The driver is responsible for avoiding situations that dictate "panic" stops. Panic stops are the major cause of on-board falls.

4.5. Traffic Signals. Establish a "decision point" when approaching traffic signals. Base this point on speed, road conditions, and traffic. Sufficient stopping distance exists if the signal changes before reaching the decision point. If the signal changes after passing the decision point, there is insufficient distance to safely stop and you should cautiously proceed through the intersection.

4.6. Skid Control. Skidding results from speed or direction changes too abrupt for road surface conditions. The ability to control skidding greatly reduces the likelihood and severity of a collision. The most critical elements in skid control involve brake manipulation, avoiding wheel lockup, and loss of control.

4.6.1. Power Skid. A power skid results from accelerating too fast for the road conditions. The drive wheels spin faster than the vehicle is moving forward. To control a power skid, ease up on the accelerator, let the vehicle gain traction again, then counter steer.

4.6.2. All Wheel Skid. The most common of all skids happen when applying brakes too hard and they lock. The vehicle is uncontrollable and slides unpredictably in any direction since there is no rolling traction aiding in control. To recover, release the brakes and counter steer if necessary.

4.7. Railroad Crossings. When approaching railroad crossings, turn on the red flashing lights, slow to a stop, open front door, look and listen for trains. After visually checking the railroad tracks, close door, turn flashers off and proceed with caution. Always stop behind the designated stop line when checking for trains. This ensures proper track clearance if a train is approaching the intersection.

4.8. Winter Operations. Perform the following when the outside air temperature is less than 32 degrees:

4.8.1. Use block heaters when vehicles are not in use. Unplug block heaters prior to starting the vehicle.

4.8.2. Apply covers to the radiator grill. This allows warmer water temperature and more heat inside the vehicle.

4.9. Inclement Weather.

4.9.1. Driving conditions deteriorate during inclement weather. Rain, sleet, snow, and fog reduces visibility and increases driving hazards.

4.9.2. Pavement becomes extremely slick after drizzle, rainfall, or snowfall begin. Oil, grease and road dirt rise to the surface forming a hazardous film when pavement initially becomes wet. As rainfall progresses, this film drains from the road making it less slippery.

4.9.3. Reduce driving speed and increase following distance. Braking distances on slippery pavement can be 2 to 10 times greater than dry pavement. Allow at least twice the normal braking distance.

4.9.4. If brakes lock when attempting to stop, release pressure on brake pedal and slowly reapply.

4.9.5. Fog is dangerous -- particularly at night. Always use low beam highlights when driving in fog. If fog is so thick you can't see the vehicle in front of you, get off the road as soon as possible. If it is necessary to park on the highway shoulder in dense fog, activate the emergency flashers. If emergency flashers become inoperable, turn off the headlights and parking lights to prevent being mistaken for a moving vehicle.

4.10. Backing Operations.

4.10.1. A spotter directs a vehicle during backing operations. When backing to aircraft, an aircrew member or designated Aeromedical Staging Facility (ASF) staff member acts as spotter. Prior to backing, ensure the spotter prepositions a wheel chock at the desired stopping point.

4.10.2. The proper position for a spotter is at the rear of the vehicle, visible in the driver's left side view mirror. ***NOTE*:** Do not attempt to back vehicle without a spotter.

4.10.3. Before backing, check for obstacles, sound horn and observe spotter through the side view mirror. Place vehicle gear shift in reverse and slowly back the vehicle.

4.10.4. Observe and follow the directions of the spotter at all times. Spotters will use standardized hand signals (see **Attachment 8**). ***NOTE*:** While on flight line, do not cross solid red line-even if directed to do so by an aircrew member.

4.10.5. If a hand signal is not recognized or the driver loses sight of spotter -- stop immediately!

4.11. Highway Driving.

4.11.1. When driving on highways or interstates, the driver needs to increase their level of awareness.

4.11.2. Thoroughly familiarize yourself with the route before proceeding. Make sure there are no height or weight restrictions along the chosen route.

4.11.3. If additional ASF personnel are passengers, utilize them as an extra set of eyes. They can visually clear the right side of the bus before right hand lane changes. Plan ahead for lane changes.

4.11.4. Prior to travel, obtain toll tickets and fuel charge card from the VCO/VCNCO.

4.11.5. Increase following distances accordingly for traffic, weather, and road conditions.

4.11.6. Keep your attention focused outside the vehicle. Be cautious and courteous at all times.

4.11.7. If available, obtain a cellular phone from unit VCO/VCNCO to use for emergency communications (NOTE: Base radio communication range is limited).

4.11.8. Observe local speed limits. Remember, these are maximum speeds. It is the driver's responsibility to determine the proper speed, according to road and weather conditions, for safe operations.

4.11.9. If wheels leave roadway, do not over control. Over steering can result in uncontrollable swerving and ultimately an accident.

4.11.10. If you experience mechanical difficulties, pull as far as possible out of the lane of traffic. Secure vehicle and set up emergency reflectors or flares. (***NOTE*:** Do not drive vehicle onto grass or dirt shoulder. If the shoulder is soft, you risk the chance of the vehicle sinking and a roll over condition existing). Space reflectors or flares starting 2 1/2 bus lengths behind the bus.

4.11.11. Before starting a trip, compile an emergency phone number list. Ask the vehicle maintenance flight about service when outside their region.

4.12. Summary. Develop the best defensive techniques for turns, clearance, speed, mirror observation, braking, and acceleration. Bus operations require advanced driving skills. Therefore, experienced vehicle operators should have more knowledge of vehicle capabilities, dimensions, equipment limitations and principles of defensive driving than the amateur driver.

Chapter 5

EMERGENCY PROCEDURES AND CONTINGENCY OPERATIONS

5.1. Stalled Engine.

5.1.1. If the engine quits while at operating speed, shift transmission to neutral, steer to highway shoulder and attempt restart while rolling to a stop.

5.1.2. Air pressure decreases rapidly when applying brakes to stop bus. If brakes are necessary, use firm steady braking pressure until bus stops. **WARNING:** Do not pump brakes! Air pressure depletes faster when pumping brakes.

5.2. Tire Blowout.

5.2.1. A blowout effects an AMBUS just as it does an automobile. However, size and weight of the AMBUS increases the chance of a resulting accident. The driver's skill greatly enhances the safe recovery of the vehicle.

5.2.2. If a rear tire blows, the bus pulls to the side of the flat tire. With a single rear tire blowout, you can drive the vehicle at reduced speeds until able to safely exit the highway.

5.2.3. A front tire blowout is an extremely dangerous situation. Swift and proper reaction is required to prevent loss of vehicle control. Hold steering wheel firmly, remove foot from accelerator, with slow steering inputs, pull onto the shoulder of the road and roll to a stop. **WARNING:** Do not apply brakes! A risk of complete lockup exists if you apply the brakes during recovery.

5.3. Fire.

5.3.1. If a fire occurs while driving, stop the vehicle as quickly and safely as possible.

5.3.2. If so equipped, immediately turn off the master switch.

5.3.3. If not equipped with a master switch, turn off ignition.

5.3.4. Evacuate the patients to a location at least 200 feet upwind of the burning vehicle.

5.3.5. After patients evacuation and patients are accounted for, make appropriate notifications.

5.3.6. If necessary, direct traffic until emergency response personnel arrive.

5.3.7. If fire is visible, and a fire extinguisher is accessible, spray base of fire until extinguished or extinguisher is discharged.

5.4. Emergency Exits.

5.4.1. There are several emergency exits on the AMBUS. Depending on make and model, the exits consist of front door, back door, window, and overhead hatches. ***NOTE*:** Window exits are not the same in each model.

5.4.2. The driver should become familiar with location and operation of all emergency exits on the model driven.

5.5. Increased Threat Condition (THREATCON).

5.5.1. During an increased threat condition (THREATCON), the driver has additional responsibilities to ensure safety of the patients and Air Force resources.

5.5.2. Take additional security measures during walk around inspection. Be alert for potential explosive devices.

5.5.3. Look for devices or suspicious objects that don't belong. Inspect all exterior and interior compartments (including under seats); undercarriage; and all accessible panels.

5.5.4. If suspicious objects are found, secure vehicle and contact appropriate authority. **WARNING:** Do not use a radio transmitter within 200 feet of object.

5.5.5. Common areas for planted explosives include, but are not limited to, fuel tanks, vehicle frame, engine, and battery compartment.

Chapter 6

MERCEDES BENZ-AMBUS (1985-PRESENT)

6.1. General Description. The Mercedes-Benz 45 passenger bus converts for AMBUS duties in United States Air Forces in Europe (USAFE). It has a six cylinder diesel engine and a manual six speed air shifted transmission. This vehicle does not have air conditioning. Like the domestic AMBUS, the operator sits forward of the front wheels.

6.2. Driver's Inspection. Similar to the U.S. Manufactured AMBUS. Refer to **Chapter 2**.

6.3. Starting Procedures.

6.3.1. With the transmission in neutral and clutch depressed, the vehicle starts by turning the ignition switch to the start position (see paragraph 6.5.2).

6.3.2. Do not attempt to move the vehicle or operate the doors until the air pressure reaches the 5.5 bar minimum. Upon reaching the minimum pressure, it is safe to operate the doors, and release the parking brake. When starting in motion, the first gear is extremely low. It is standard practice to start forward motion in second gear.

6.3.3. To use the exhaust brake, depress the floor mounted button (ensuring the accelerator is not being depressed). Once the exhaust brake lowers the engine RPMs, release it, depress clutch and move into the next lower gear. Repeat, if necessary, to slow down. The exhaust brake, used in conjunction with the brake pedal, effectively reduces vehicle speed.

6.4. Shutdown Procedures.

6.4.1. Accomplish shutdown with the parking brake applied and the transmission in neutral.

6.4.2. With all electrical equipment turned off, pull engine shutdown knob to stop engine.

6.4.3. Turn ignition switch off. Secure the front door using the exterior control button. Secure all outside compartments.

6.5. Interior Controls and Features. Interior controls of the Mercedes-Benz AMBUS are clearly marked and user friendly.

6.5.1. Transmission. The gear indicator displays which gear the transmission is engaged. LED fault codes flash if the transmission malfunctions. If this occurs, remove the vehicle from operation and report the problem to the vehicle maintenance flight immediately.

6.5.1.1. Turn the key switch one position to illuminate the gear indicator display. If not in neutral, depress the clutch and move the shifter (located to the right of the driver seat) to the left. After hearing an audible click, the transmission is in neutral as displayed by the gear indicator. Release the shifter and it will return to its original position.

6.5.1.2. The shifter is different from a conventional shifter, it is comparable to a computer joystick since it is an electronic style shifter. Moving the shifter forward activates a higher gear, while moving it backward shifts into a lower gear. Move the shifter to the left and the transmission returns to neutral. By depressing the button on the front of the shifter and moving the shifter forward, the transmission skips one gear (neutral to second, third to fifth, etc.). Depressing the button and moving shifter backward, the transmission goes into reverse. If shifted into neutral

while driving, simply move shifter forward and the appropriate gear for the road speed will automatically select. Do not force the shifter. Lightly push the shifter forward, backward or to the left (until it clicks) to select the desired gear. The gear indicator will illuminate the selected gear.

6.5.2. Panel Switches. There are two panels of switches.

6.5.2.1. On the left panel are switches for the front and rear heaters, roof vents, fresh air flap and the side mirror defroster.

6.5.2.2. The right panel contains switches for the hazard lights, supplemental heater (preheats the vehicle during cold weather and warms the interior when the engine is running), the interior patient lights, driver's light, lower storage area lights, exhaust brake actuator (or "jake brake") and the doors.

6.5.3. Lever Switches. The lever on the left side of the steering column has several functions. With headlight switch turned on, the headlights are dim when lever is in neutral position. Pulling lever towards driver momentarily brightens the headlights but only when holding the lever (this also flashes the headlights with the headlight switch off). When released, it automatically goes to dim position. Pushing lever away from driver brightens headlights. From bright position, pull the lever toward driver to the dim the headlights. To activate right turn signal, push lever up. To activate left turn signal, pull lever down. Pressing the button on the end of the lever activates the horn. Rotating the body of the lever activates the windshield washer/wiper.

6.5.4. Tachograph Displays. The tachograph is next to the left switch panel. It consists of a speedometer (marked in kilometers per hour [Km/h]), clock, tachograph fault indicating LED, odometer and speed warning light. The speed warning light indicates that the operator has exceeded the USAFE speed limit of 80 Km/h. This light remains on if the vehicle speed is not lowered. This results in disciplinary action for the operator.

6.5.4.1. The tachometer shows current engine speed, in RPMs and optimal fuel economy range in shaded areas of the gauge. The tachometer also contains the maintenance indicator for annual scheduled maintenance.

6.5.4.2. This vehicle has indicator lights for low fluids, electrical problems, brake problems, systems that are functioning or malfunctioning and lights being used. If an indicator light illuminates, immediately assess the problem. If not correctable by vehicle operator, report to the vehicle maintenance flight as soon as possible.

6.5.5. Instrument Cluster/Dashboard Controls. The instrument cluster contains oil pressure, engine temperature, diesel fuel level, duplex air pressure gauges, and brake pressure warning light.

6.5.5.1. The duplex air pressure gauge monitors both circuits of the brake system. If pressure of either circuit falls from the 5.5-8.5 bar window, stop the vehicle as quickly and safely as possible. Remove from service immediately and notify maintenance of the problem.

6.5.5.2. The temperature adjustment dials alter the air temperature circulated by the heaters.

6.5.5.3. In addition to the dashboard heater switches, the floor mounted heater in the front of the vehicle has three levers. They regulate air flow, induction of fresh air, and direction of air to either the rear of the vehicle or to the windshield for defrosting.

6.5.5.4. Use the emergency valve when the air system in the front doors malfunction. This valve, relieves the pressure in the doors and allows manual manipulation. The valve located above the

rear doors operates the same way. This feature also aids in emergency evacuation of the bus when sufficient pressure is not available.

6.5.5.5. The engine shutoff knob stops the engine prior to electrical shutdown of the vehicle using the key switch.

6.5.6. Light Switches.

6.5.6.1. Adjust the instrument panel lights with the dimmer dial located on the dashboard next to the temperature adjustment dials.

6.5.6.2. Turn the light switch one position to the right for parking lights. Two positions to the right for headlights. With driving lights on, pull the switch out one position for front fog lights and two positions for front and rear fog lights.

6.5.7. Braking.

6.5.7.1. With the exhaust brake switch on the dashboard turned on, the floor button activates the brake while driving the vehicle. This feature uses the recirculation of exhaust gases of the engine to slow the vehicle. While this is being applied, do not use the accelerator pedal.

6.5.7.2. Apply the parking brake by pushing downward. To release the parking brake pull out and up. If for some reason the parking brake does not release, the adjacent switch releases it during emergency situations. Once the brake releases, reposition the switch before further operation. If any indicator lights on the dashboard warn of brake system malfunctions, remove the vehicle from operation and contact maintenance immediately.

6.5.8. Fire Extinguisher. The fire extinguisher is behind the operator, strapped under the first passenger seat. The tire jack is in an accessible panel behind the stairs of the rear door.

6.6. Exterior Controls and Features.

6.6.1. The Mercedes-Benz AMBUS has seven (7) storage compartments around the vehicle. They allow storage space for empty litters, medical equipment, extra litter stanchions, and wrenches for changing the tires.

6.6.2. In addition to storage compartments there are several access panels on the vehicle. These panels allow easy access to the engine.

6.6.2.1. One panel contains the exterior control button for the front door. This closes the front air-operated doors after vehicle shut-down and allows securing of the vehicle. Lock all the panels with a key.

6.6.2.2. Other panels allow access to the fuel tank, windshield washer fluid reservoir, and all essential engine fluids. To include coolant, engine oil, power steering oil and alcohol.

6.6.3. The front of the vehicle has a built in step to ease cleaning the front window. It's released by pushing the button located on top of the step allowing it to fold down. After use, lock the step back into place.

6.6.3.1. Behind this step, accessed from beneath the vehicle, is the spare tire. Lower from its storage area with the wrenches found in the storage compartments on the side of the vehicle.

6.6.3.2. When changing a front tire, position the tire jack under the front axle beam.

6.6.3.3. When changing a rear tire, position the tire jack below the spring bracket--never under the differential housing!

6.6.4. There are eight (8) emergency exit windows for emergency egress. These windows, are broken with the wall mounted hammers. There are also two roof mounted escape hatches. Push out in the event of a rollover. These features coupled with the pair of air operated doors allow sufficient escape routes during emergency evacuation.

6.7. Vehicle Conversion.

6.7.1. Unlike the domestic model, this vehicle converts easily from ambulatory to litter configuration in minimal time. It is capable of carrying twelve litter patients, 45 ambulatory patients or any combination of the two.

6.7.2. Converting the standard 45 Passenger bus to AMBUS configuration, requires the addition of an oxygen tank and medical equipment, dictated by patient needs. The "H" cylinder oxygen tank is located behind the rear side loading doors, held securely to the wall and the handrail with straps. The oxygen tank extension tubing is capable of reaching any patient in the vehicle. Medical equipment is easily accommodated in the center aisle while in use, or stored under the vehicle if patient requirements change. The oxygen cylinder and medical equipment are retained as in the ambulatory configuration.

6.7.3. When the AMBUS is in litter configuration, place all seat backs in their lowest position on top of the seat base. To lower seat backs, lift the knobs on both sides of seat and drop down the seat back. The seats have a raised portion for knee support which needs lowered to ensure the litter is completely level. Pull the silver latch, located under the seat, toward you to lower and fold under the seat. This configuration allows bolting litter stanchions to the walls of the vehicle at pre-existing attachment points. The stanchions are stored beneath the vehicle when not in use, allowing reconfiguration of the vehicle at any time.

6.8. Terms. For a complete list of terms, refer to Air Force Directory (AFDIR) 41-317, *Compendium of Aeromedical Evacuation Terminology*.

CHARLES H. ROADMAN, II, Lt General, USAF, MC
Surgeon General

Attachment 1

GLOSSARY OF REFERENCES, ABBREVIATIONS, AND ACRONYMS

References

AFPD 24-3, *Operational Maintenance and use of Transportation Vehicles and Equipment*

AFI 24-301, *Vehicle Operations*

AFJMAN 24-306, *Manual for the Wheeled Vehicle Driver*

AFMAN 24-309, *Vehicle Operations*

AFI 41-305, *Administering Aeromedical Staging Facilities*

AFH 41-312, Volumes 1 and 4, *Aeromedical Evacuation Contingency Operations Training (AECOT)*

AFDIR 41-317, *Compendium of Aeromedical Evacuation Terminology*

Abbreviations and Acronyms

AFDIR—Air Force Directory

AFH—Air Force Handbook

AFI—Air Force Instruction

AFJMAN—Air Force Joint Manual

AFMAN—Air Force Manual

AFPD—Air Force Policy Directive

AMBUS—Ambulance Bus

ASF—Aeromedical Staging Facility

FAA—Federal Aviation Administration

IH—International Harvester

PSI—Pounds per square inch

RPM—Revolutions per minute

RV—Recreational vehicle

THREATCON—Threat Condition

USAFE—United States Air Forces in Europe

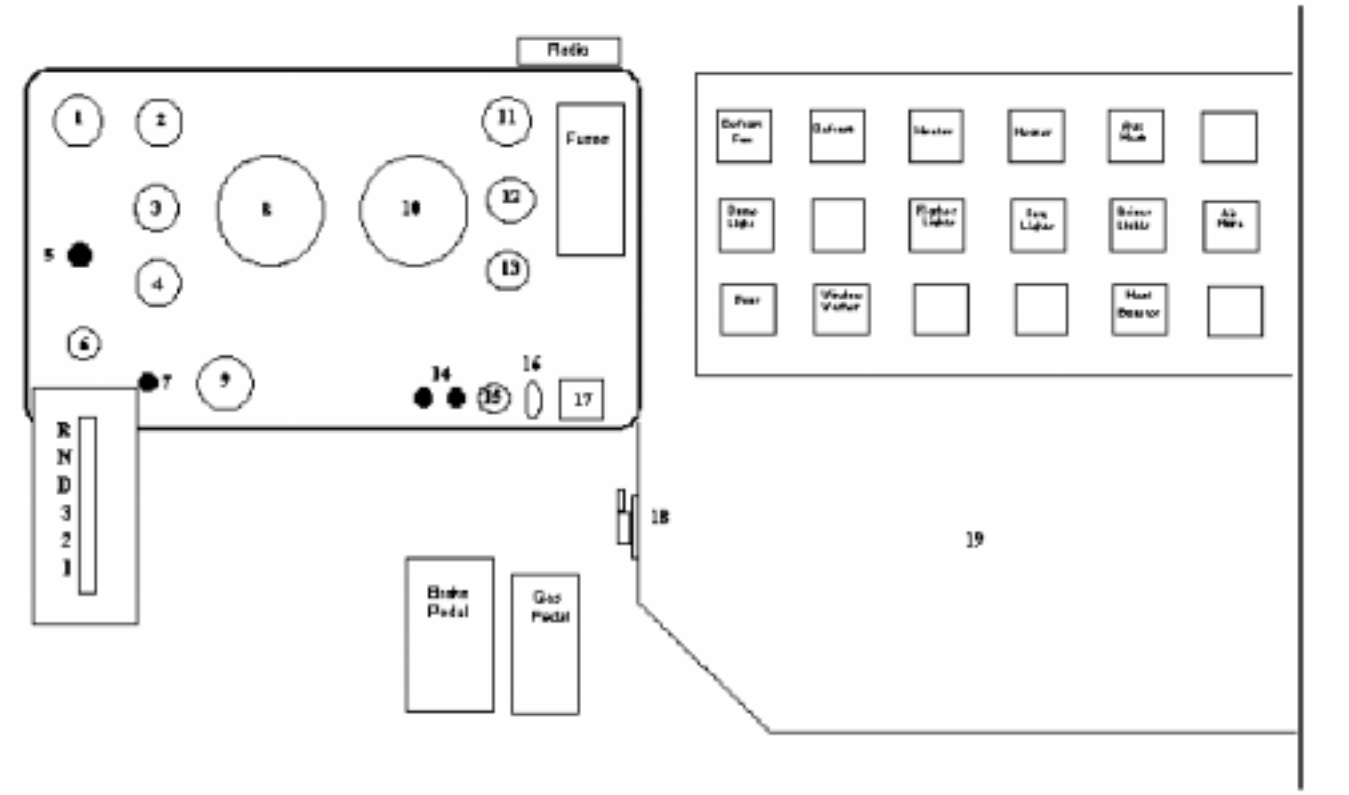
VCO—Vehicle Control Officer

VCNCO—Vehicle Control Non-Commissioned Officer

Attachment 2

1979 INTERNATIONAL HARVESTER AMBUS CONTROLS

Figure A2.1. Driver's Controls (79 IH).



1. Amperage Gauge

2. Water Temperature Gauge

3. Oil Temperature Gauge

4. Voltmeter

5. Light Switch

6. Key Switch

7. Ether Start

8. Tachometer

9. Air Conditioner Fuel Gauge

10. Speedometer

11. Fuel Gauge, Main Tank

12. Air Tank Pressure Gauge

13. Air Tank Pressure Gauge

14. Windshield Wiper Controls

15. Automatic Throttle

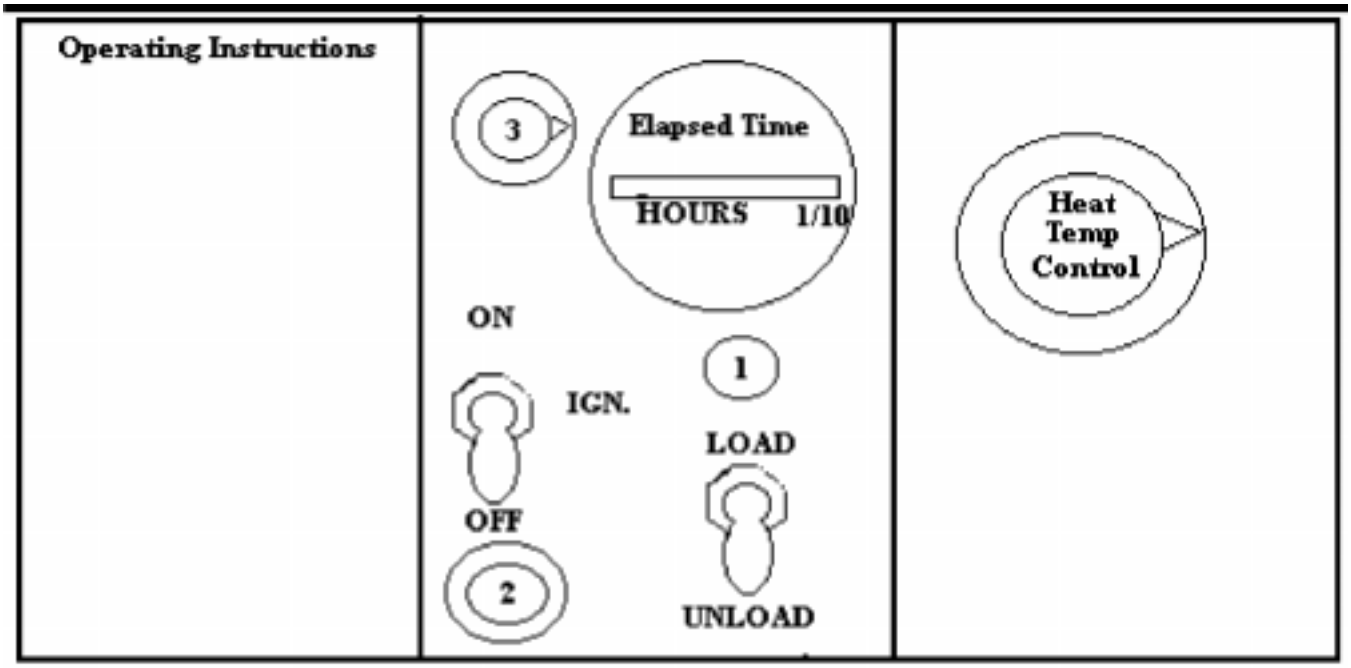
16. Engine Stop

17. Parking Brake

18. Master Electrical Switch

19. Engine Cover

Figure A2.2. Air Conditioner Control (Gasoline) (79 IH).



1. Low Oil Pressure Indicator Light

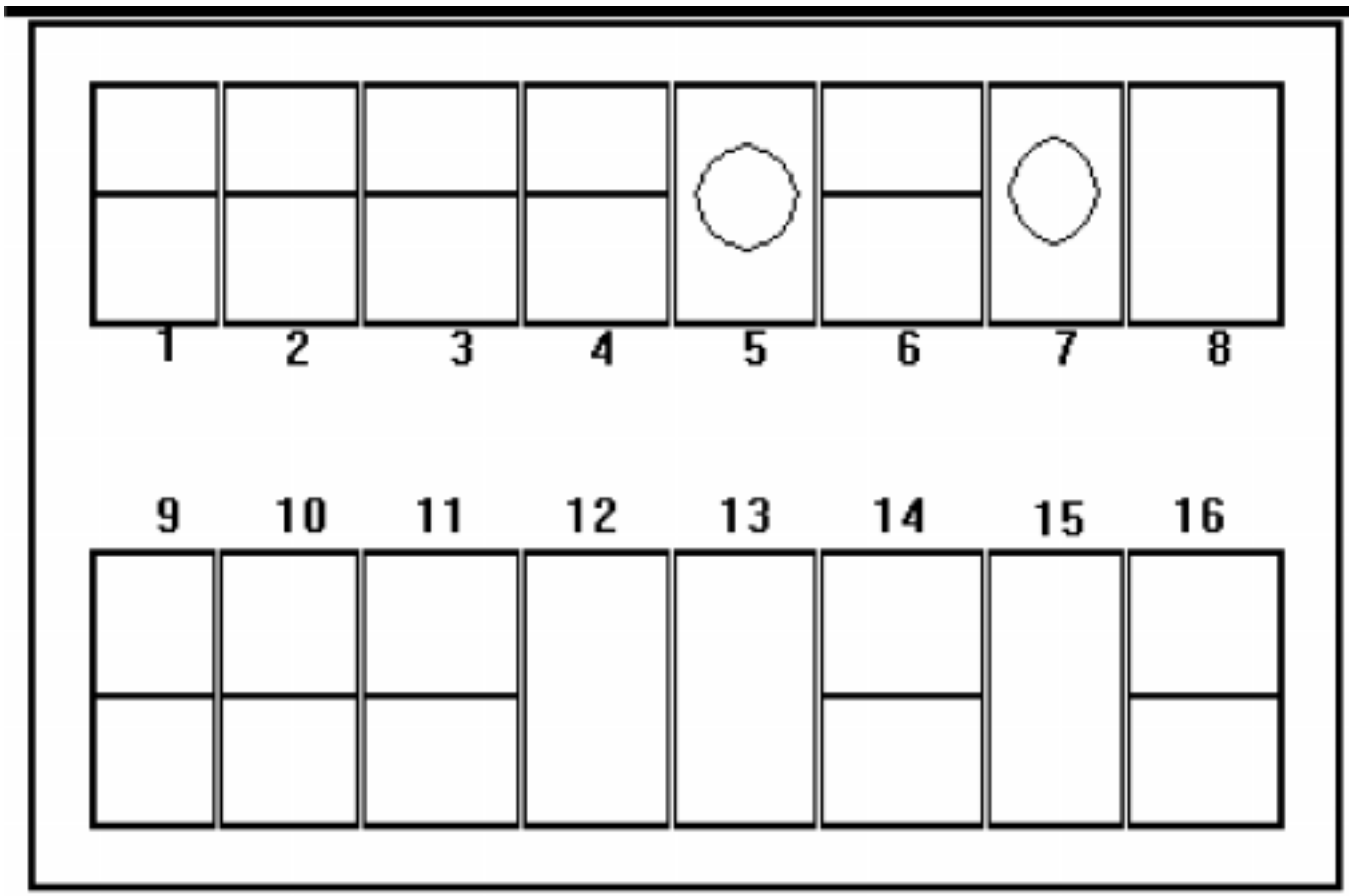
2. Start Button

3. Cold Air Temperature Control

Attachment 3

1982 CARPENTER AMBUS CONTROLS

Figure A3.1. Accessory Switch Panel (82 Carpenter).



1. Back Up Light

2. Heat Pump

3. Hot Box

4. Dome Light

5. Dome Light

6. Windshield Wiper

7. Light Bar

8. Empty

9. Overhead Flashers

10. Fog Lights

11. Rear Heater

12. Empty

13. Empty

14. Middle Heater

15. Empty

16. Aux Fan

Figure A3.2. Radio and Air Conditioner Location.

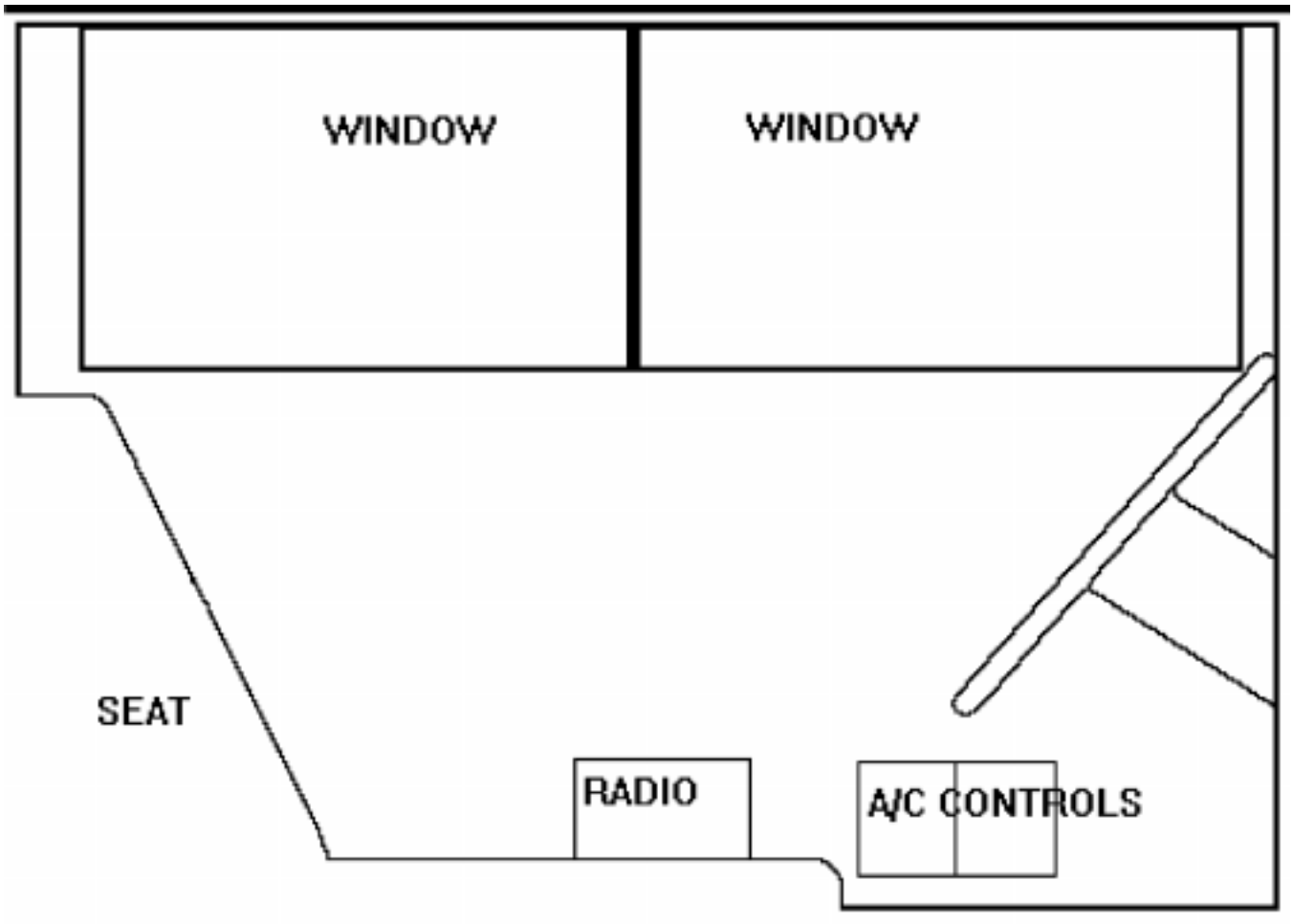
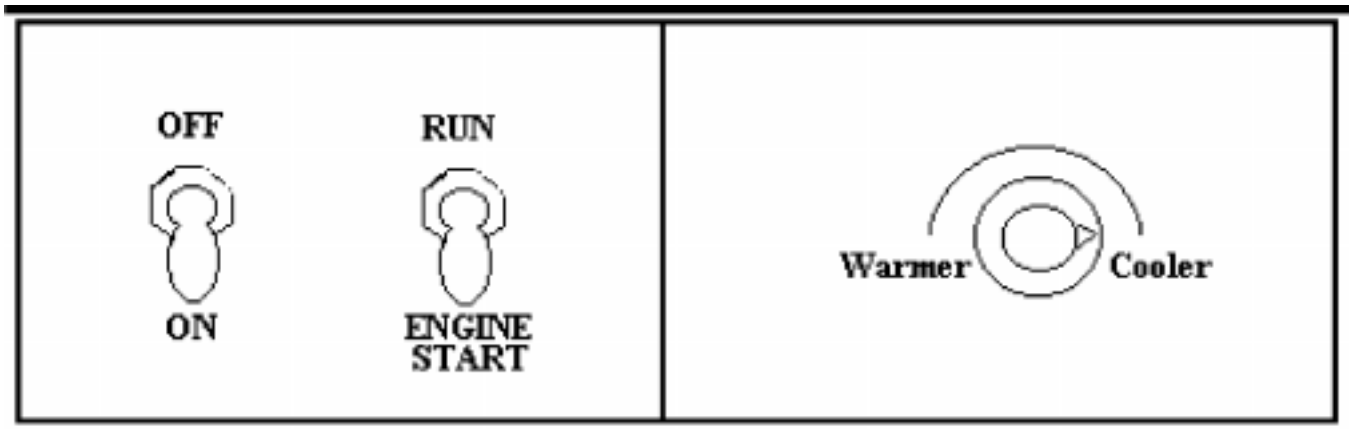


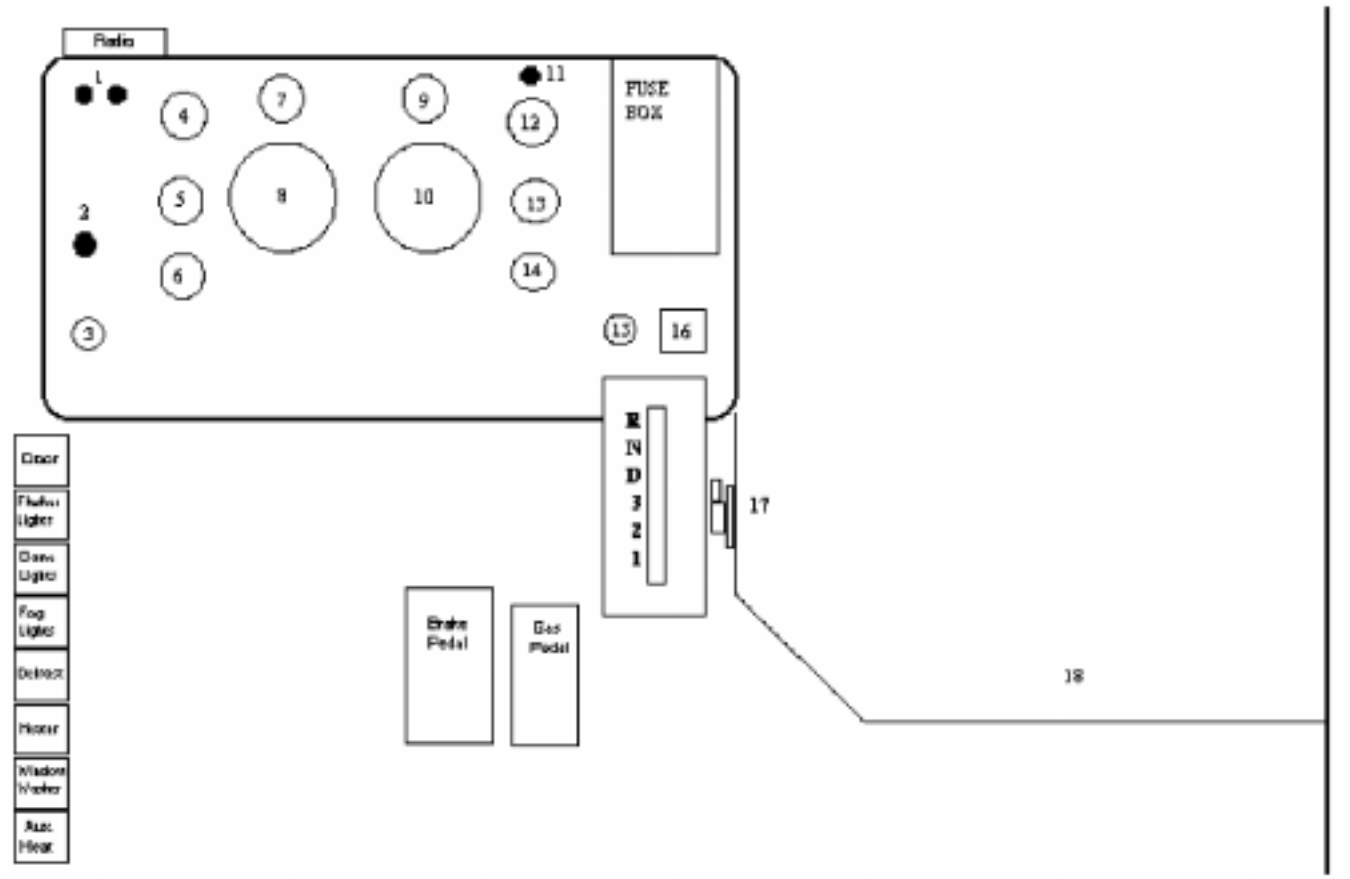
Figure A3.3. Air Conditioner Controls (82 Carpenter).



Attachment 4

1983 INTERNATIONAL HARVESTER AMBUS CONTROLS

Figure A4.1. Driver's Controls (83 IH).



1. Windshield Wipers

2. Headlights

3. Key Switch (Ignition)

4. Water Temperature Gauge

5. Oil Pressure Gauge

6. Voltmeter

7. Air Cleaner Restriction Warning Light

8. Tachometer

9. Air Conditioner Fuel Gauge (Gasoline)

10. Speedometer

11. Ether Start

12. Main Fuel Gauge

13. Air System Pressure Gauge

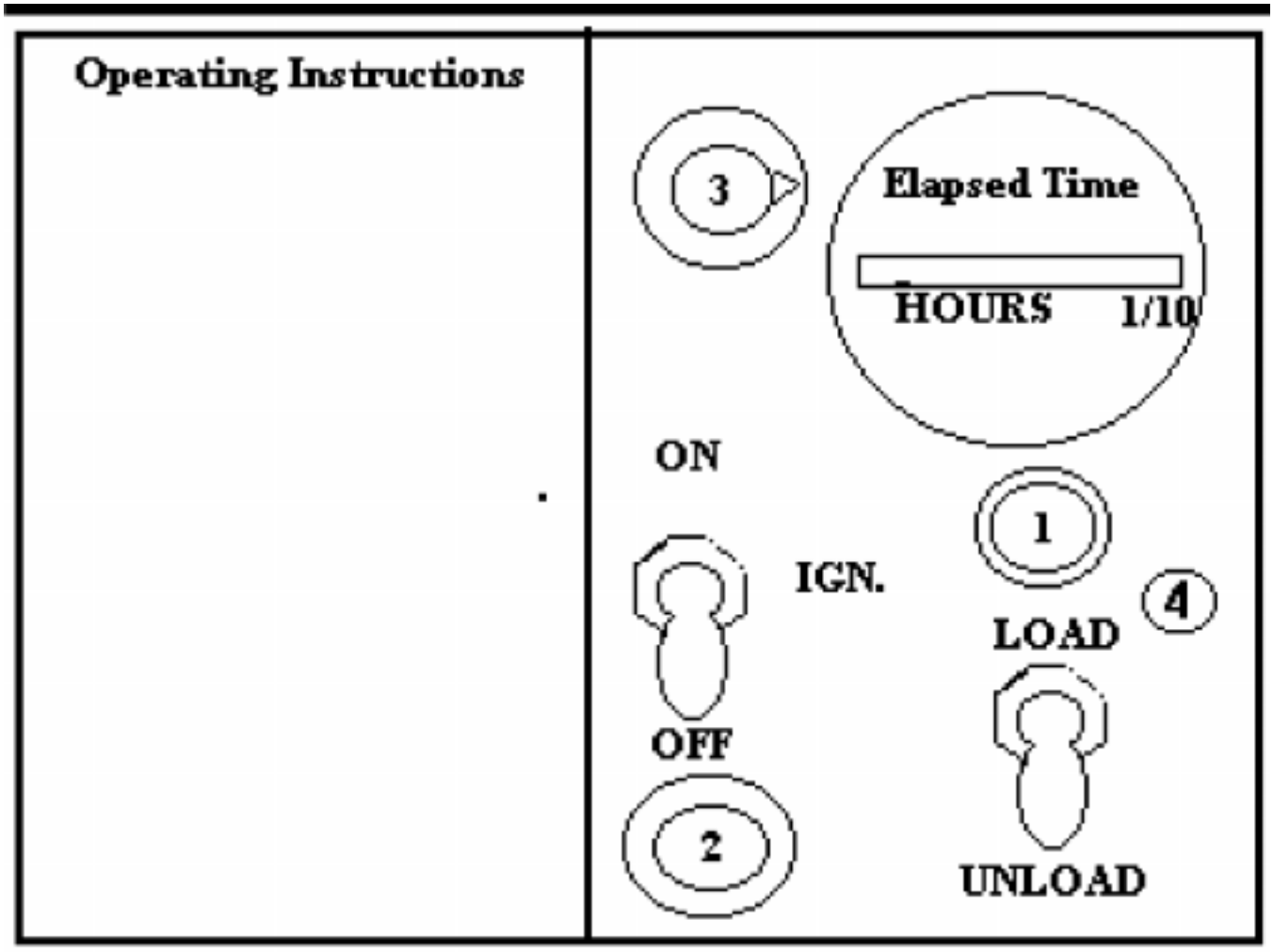
14. Air System Pressure Gauge

15. Auto Throttle

16. Parking Brake

17. Electric System Master Switch

Figure A4.2. Air Conditioner Controls (83 IH).



1. Choke Button (Push Type)

2. Start Button (Push Type)

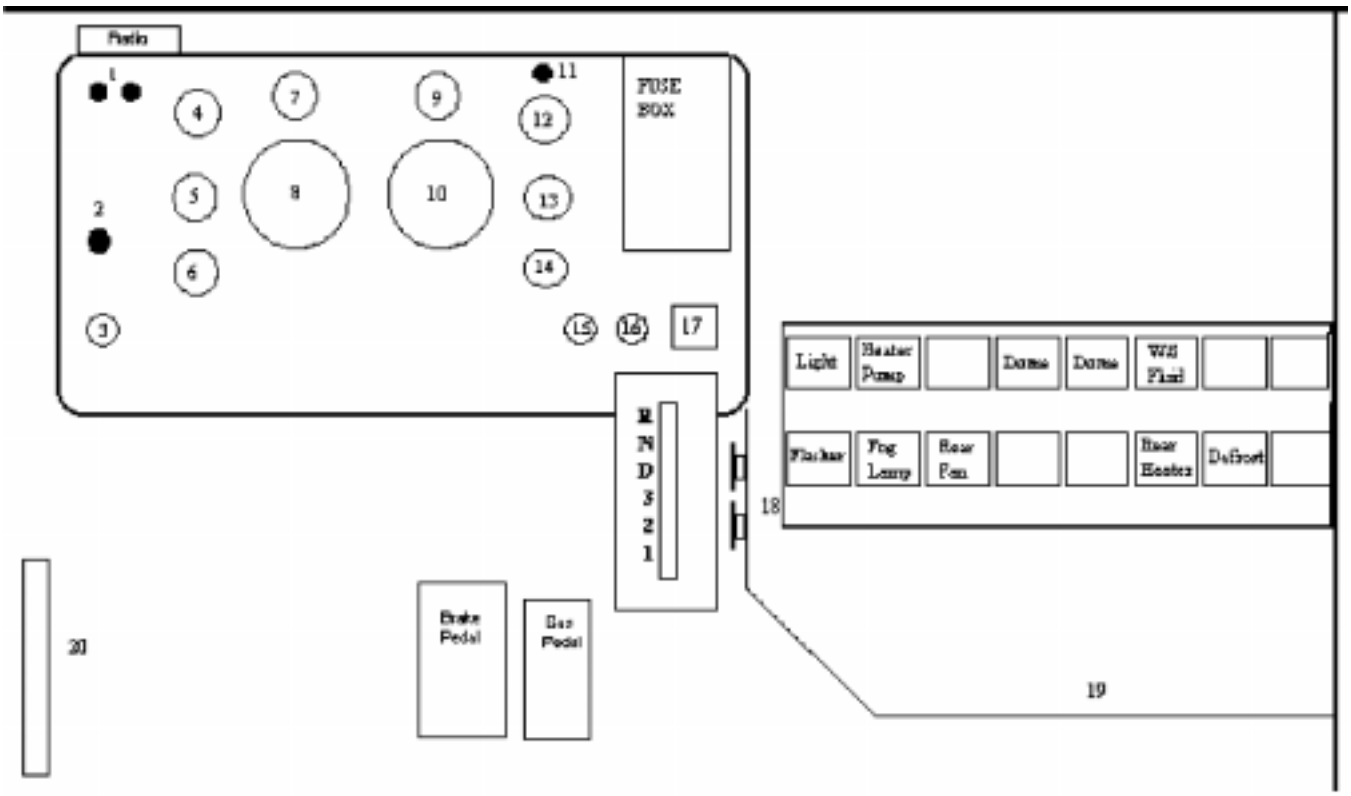
3. Cool Air Temperature Control

4. Low Oil Pressure Indicator Light

Attachment 5

1985 INTERNATIONAL HARVESTER AMBUS CONTROLS

Figure A5.1. Driver's Controls (85 IH).



1. Windshield Wipers

2. Headlights

3. Key Switch (Ignition)

4. Water Temperature Gauge

5. Oil Pressure Gauge

6. Voltmeter

7. Air Cleaner Restriction Warning Light

8. Tachometer

9. Air Conditioner Fuel Gauge (Gasoline)

10. Speedometer

11. Ether Start

12. Main Fuel Gauge

13. Air System Pressure Gauge

14. Air System Pressure Gauge

15. Auto Throttle

16. Choke

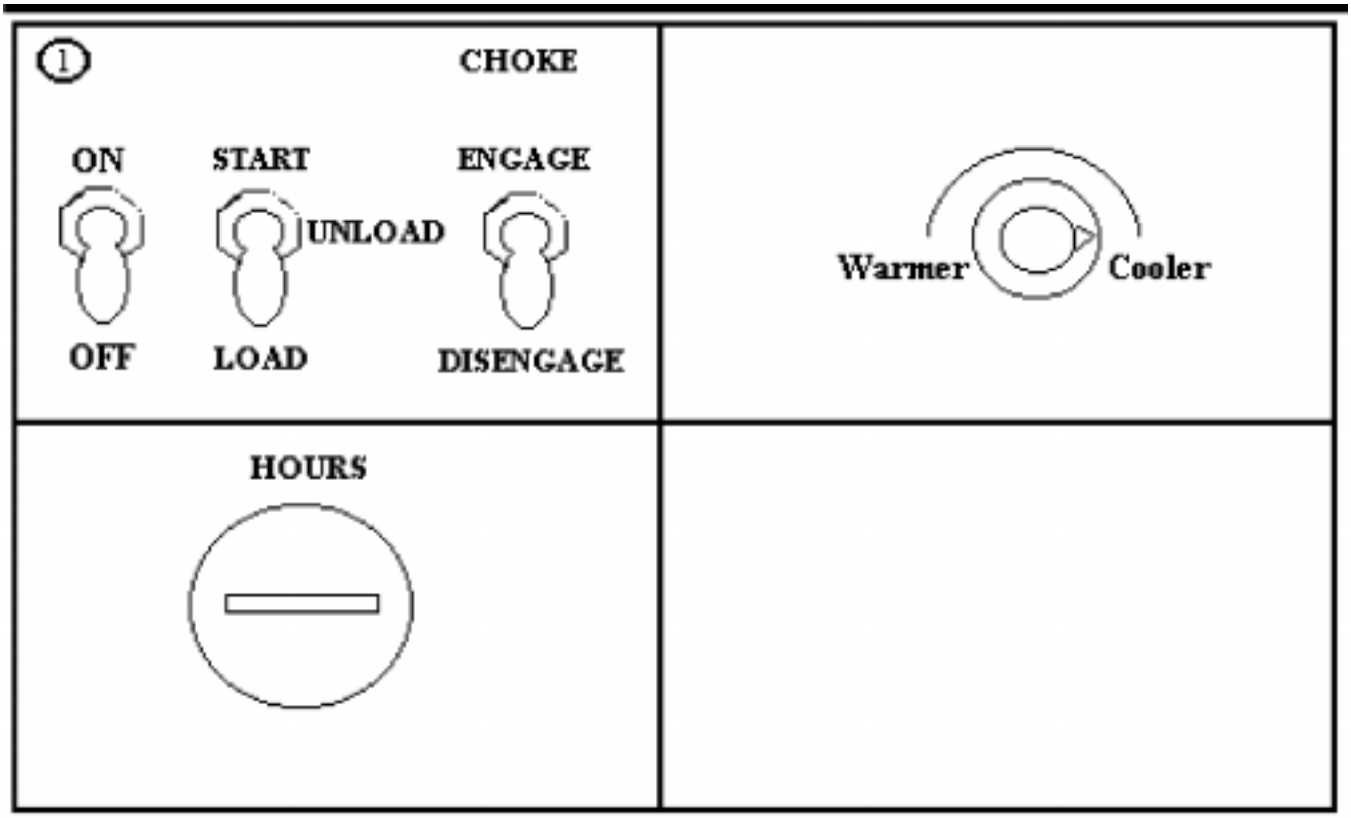
17. Parking Brake

18. Windshield Wiper Controls

19. Engine Cover

20. Air Conditioner Controls

Figure A5.2. Air Conditioner Controls (85 IH).

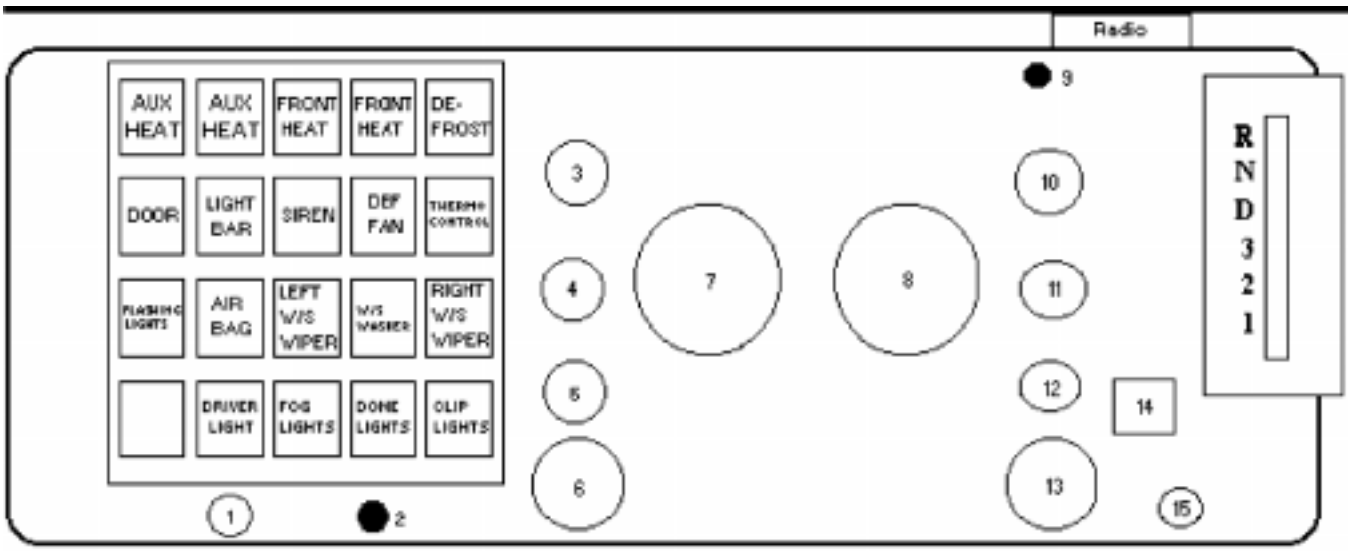


1. Power Indicator Light

Attachment 6

1988 INTERNATIONAL HARVESTER AMBUS CONTROLS

Figure A6.1. Drivers Controls (88 IH).



1. Key Switch

2. Headlights

3. Water Temperature Gauge

4. Oil Pressure Gauge

5. Voltmeter

6. Air Conditioner Fuel Gauge

7. Tachometer

8. Speedometer

9. Ether Start

10. Main Fuel Gauge

11. Air System Pressure Gauge

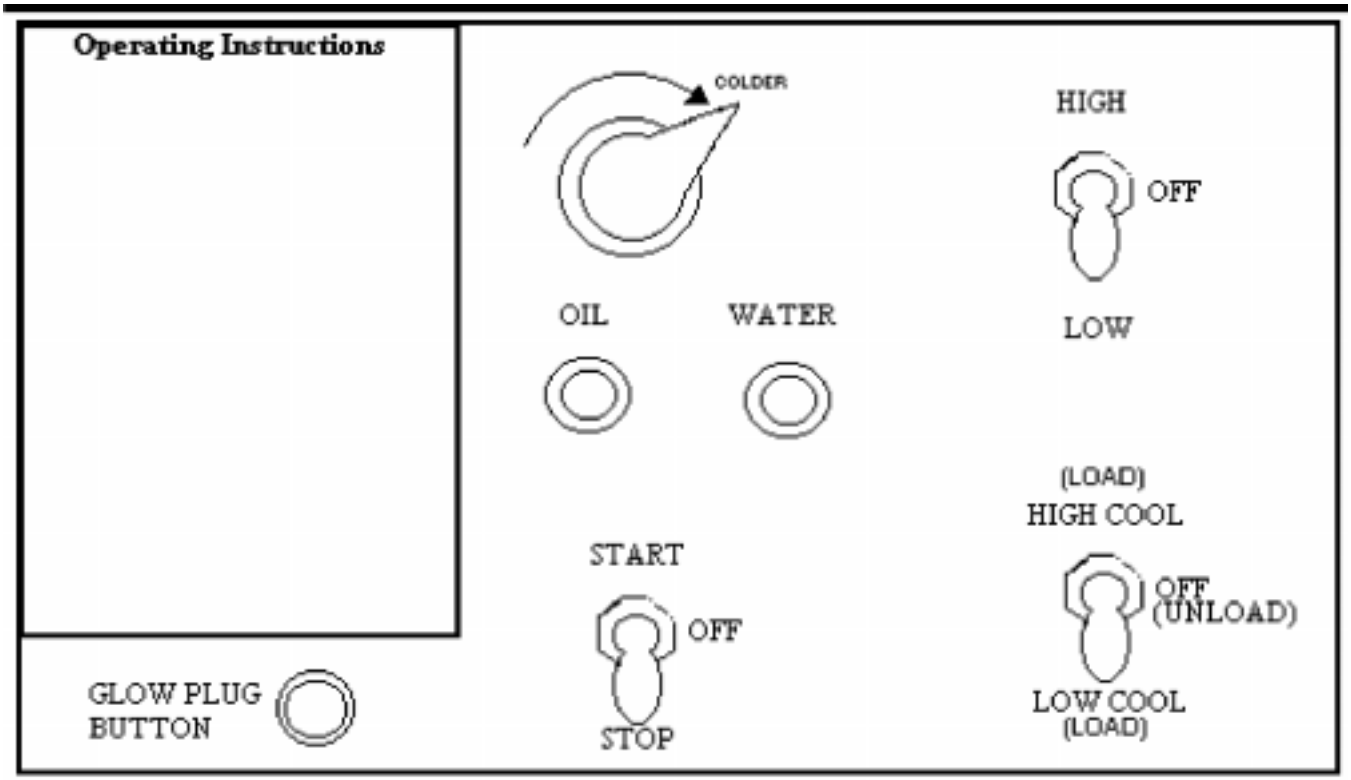
12. Air System Pressure Gauge

13. Air Cleaner Restriction Gauge

14. Parking Brake

15. Auto Throttle

Figure A6.2. Air Conditioner Controls (88 IH).

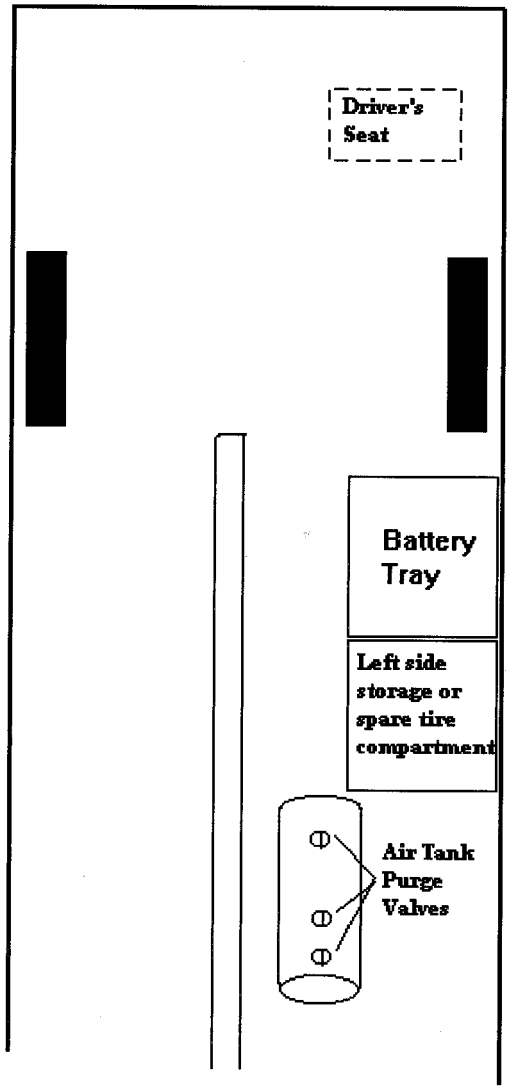


Attachment 7

SERVICE PIT VIEW OF AMBUS (US MANUFACTURED)

Figure A7.1. Service Pit View of AMBUS.

Front of AMBUS



Rear of AMBUS

Attachment 8

HAND SIGNALS

Figure A8.1. Come Ahead.

NOTE:

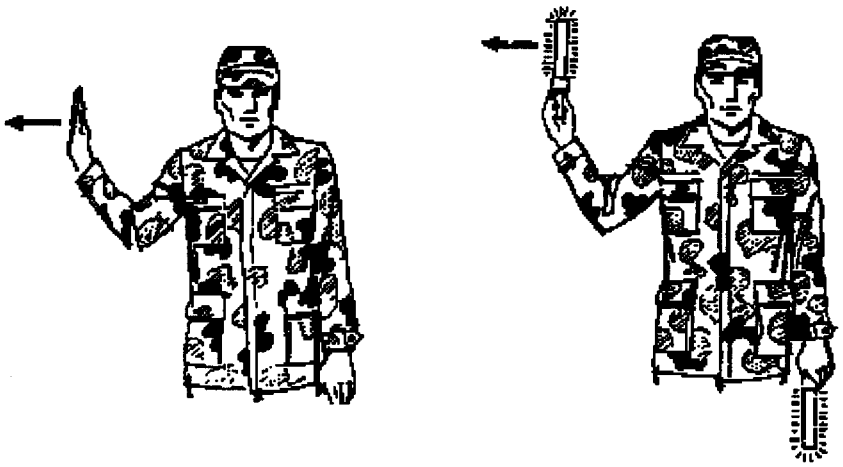
During night time operations, flashlights on only when motioning in desired vehicle direction. When using conventional flashlights, direct lights forward.

NOTE:

During night time operations, when using conventional flashlights, direct light in left hand forward.

Figure A8.2. Turn Left.

DAY NIGHT



NOTE:

During night time operations, when using conventional flashlights, direct light in right hand forward.

Figure A8.3. Turn Right.

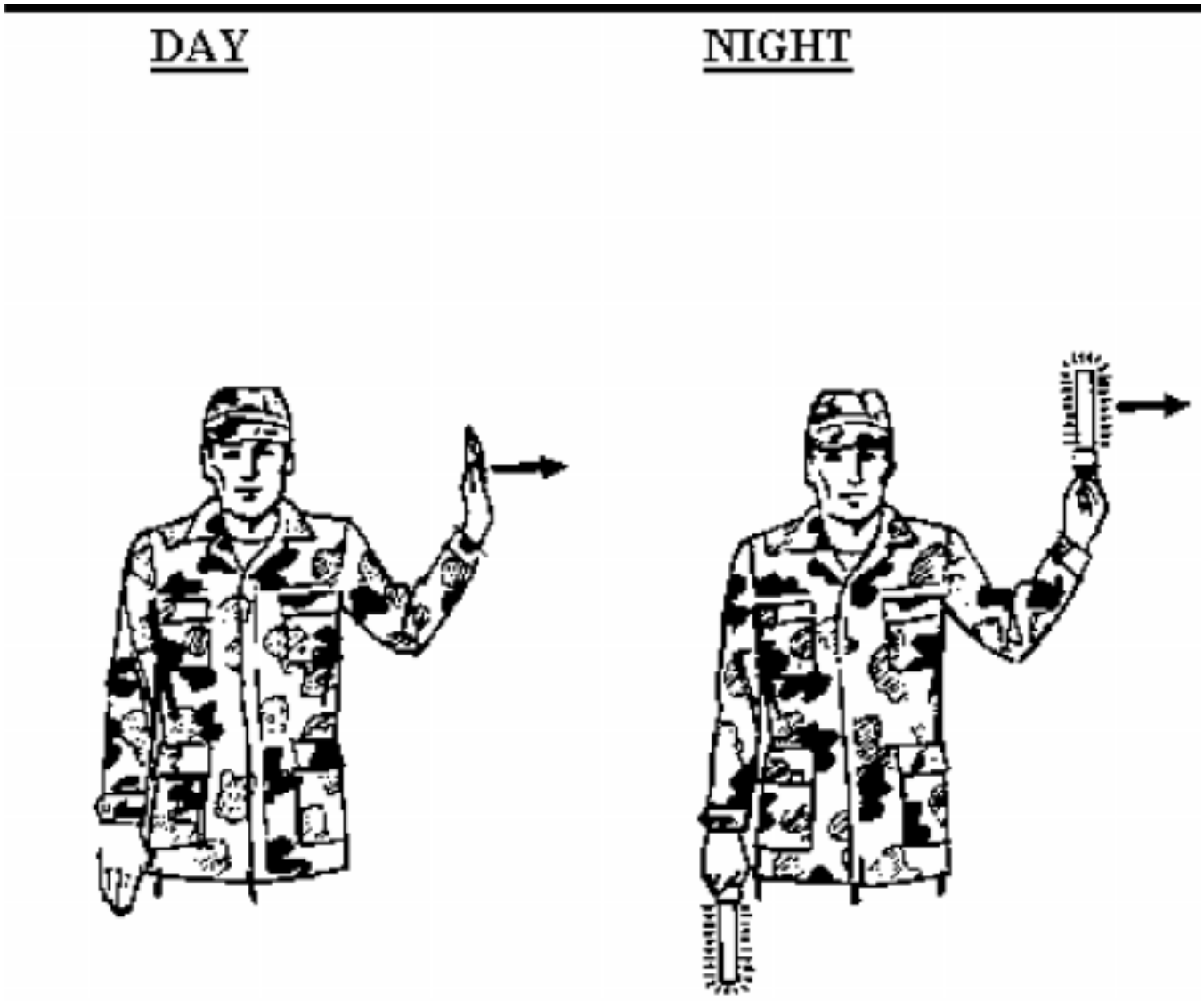


Figure A8.4. Slow Down.

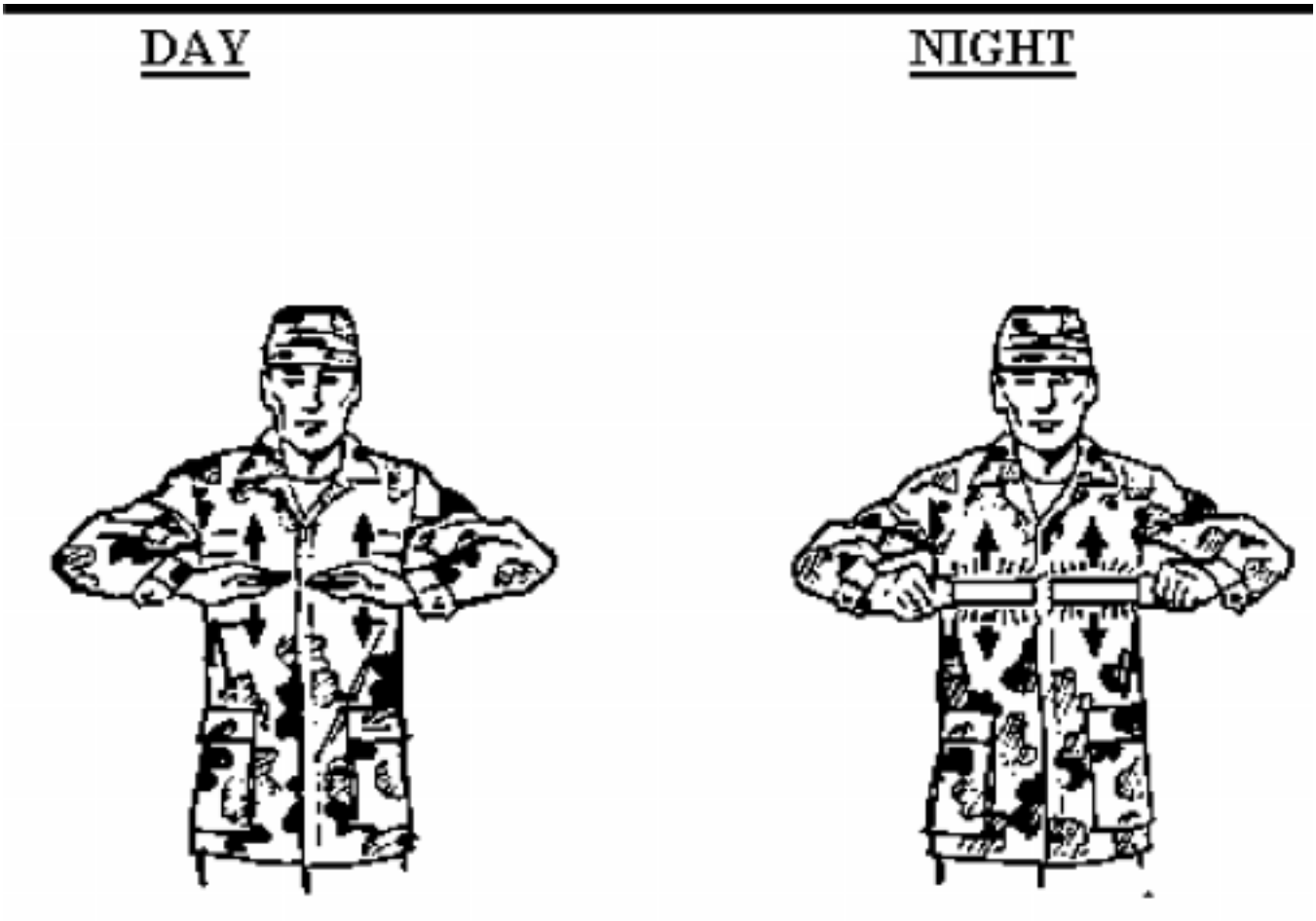


Figure A8.5. Stop or Halt.

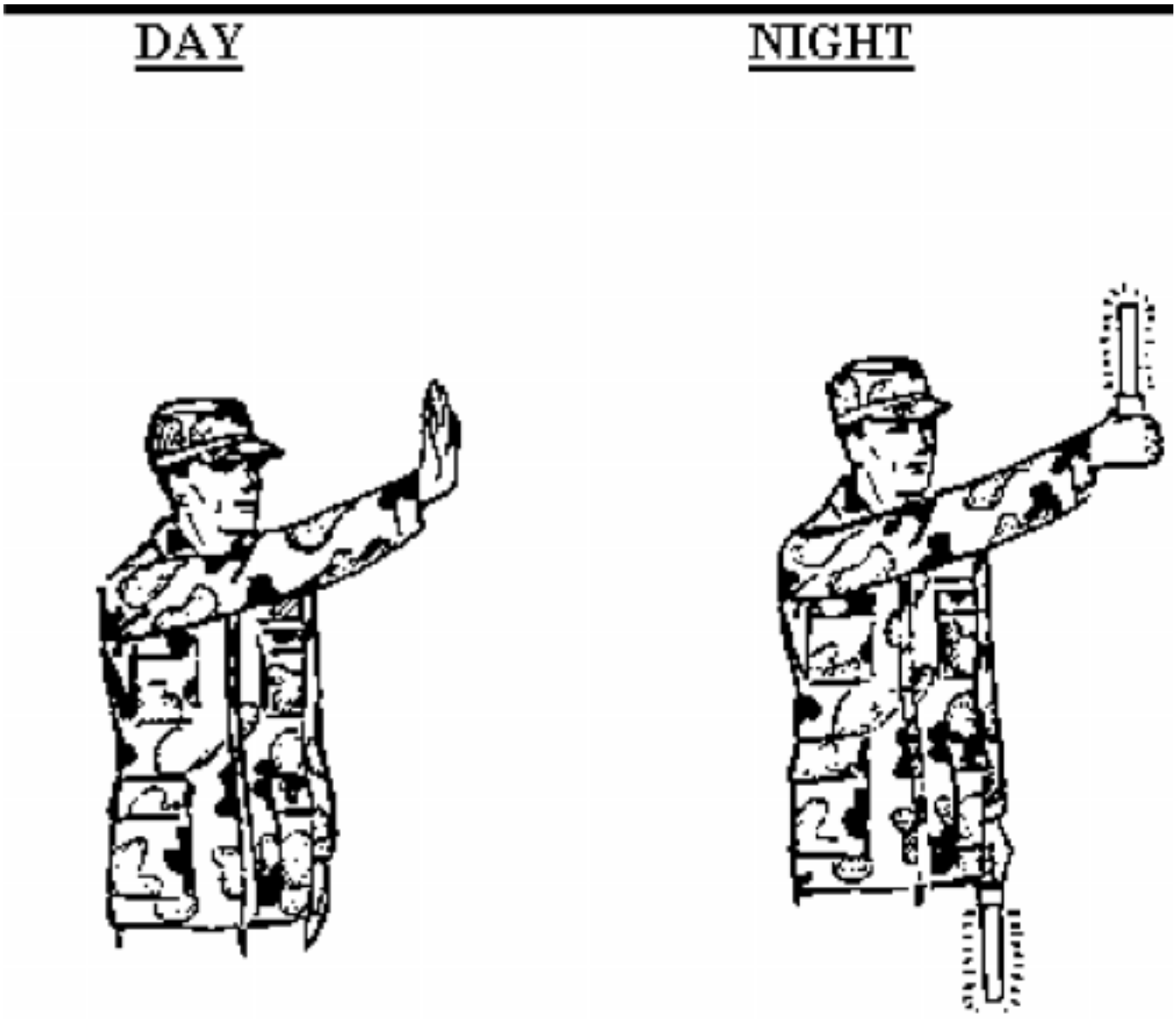
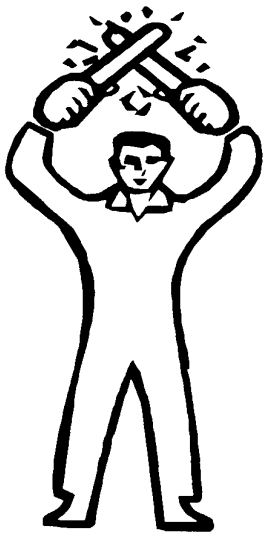


Figure A8.6. Stop or Halt Around Aircraft.

DAY

NIGHT



NOTE:

Arms crossed above the head, palms facing forward. This is the FAA signal for emergency stop.

Attachment 9

AMBUS LESSON PLAN

A9.1. Objective. Qualify trainee on safe operation to include operator maintenance.

A9.2. Instructor's References.

- AFPD 24-3, *Operational Maintenance and use of Transportation Vehicles and Equipment*.
- AFI 24-301, *Vehicle Operations*.
- AFJMAN 24-306, *Manual for the Wheeled Vehicle Driver*.
- AFH 41-318, *Ambulance Bus (AMBUS) Training Standards*.

A9.3. Prerequisites.

- Trainee has read AFH 41-318 and accomplished open book test.
- Valid state driver's license according to applicable AFI's.

A9.4. Plan of Instruction.

- Explain importance and purpose of AMBUS.
- Conduct a walk-around inspection with student.
- Demonstrate proper operating procedures.
- Documentation of applicable forms.
- Familiarize with instrumentation, systems, and litter configuration.

A9.5. Demonstration.

A9.5.1. The Instructor will:

- Demonstrate a detailed walk-around inspection using AF Form 1800 and AMBUS checklist to include:
- Engine compartment.
- Windshield washer reservoir.
- Battery and battery tray.
- Fuel tanks.
- Exterior lights.
- Air system maintenance.
- Fuel Gauge.
- Air Pressure Gauge.
- Speedometer/Odometer.
- Warning Lights.
- Light switches.

- Windshield Wiper/Washer switch.
- Heater/Defroster switches/heat pump switch.
- Air conditioner operation.
- Auto-throttle.
- Door operation/Emergency exits.
- Demonstrate operating procedures to include:
- Safety considerations.
- Starting.
- Backing.
- Marshaling.
- Handling.
- Braking.
- Emergency situations/hazardous conditions.
- Vehicle accident reporting.
- Parking/shut-down.
- Configuration.

A9.5.2. The Student will demonstrate a knowledge of:

- Inspection.
- Operation.
- Confined area operation.
- Highway driving:
- Following distance/braking.
- Railroad crossings.
- Lane changes.
- Inclement weather.
- Proper backing techniques/marshaling.
- Parking/shutdown procedures.
- Configuration.
- Operator maintenance/cleaning.

A9.6. Student Outcomes. Explain and perform:

- Daily/routine inspections.
- Operation of instruments/control panel.

- Operating procedures.
- Starting.
- Maneuvering.
- Shutdown.
- Configuration.
- Documentation of applicable forms.
- Operator maintenance/cleaning.

A9.7. Evaluation.

A9.7.1. Instructor:

- Operation.
- Closed book written test.
- Review missed questions.
- Final checkride recommendation.

A9.7.2. Student:

- Safe operation.
- Minimum score of 80% on written test.
- Review missed questions.
- Pass final checkride.
- Critique.